



# History of the Federal Water Programs

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This chapter briefly reviews the historical evolution of the water resources missions of the federal agencies.<sup>1</sup> Two major themes emerge in this chapter. First, the objectives of the federal water resources programs have evolved from regional project development to resource management. The federal government's transition from regional developer to resource manager is still incomplete. Second, this evolution has not been accompanied by the development of hydrologically rational governance units to resolve the intense conflicts that have arisen from increasingly more diverse demands for water.

The following topics are discussed:

1. The federal constitutional authority to manage water.
2. An overview of the history and evolution of federal involvement in water policy, development, and management. This section discusses the major areas of navigation, flood control, irrigation, Native American water issues, hydropower, pollution control, and fish and wildlife. In the context of watershed management, the responsibilities of the land

management agencies and the interrelationships among those activities, water resources, and watershed management are also discussed.

3. A summary of previous major national water commissions, including a description of recurring themes among the Western Water Policy Review Advisory Commission's findings.

## *Federal Constitutional Authority to Manage Water*

The federal power to regulate the use of water stems from the power under the constitution to regulate commerce "with foreign nations, and among the several states, and with the Indian tribes." This federal authority was built on international law, adapted to the need to develop inland arteries of commerce. Freedom of navigation is a customary right under international law, and this right has been recognized in treaties since the Paris Treaty of 1783. Initially, there was doubt about the federal government's constitutional power to undertake internal improvements to promote navigation. However, in 1824, *Gibbons v. Ogden*, the Supreme Court confirmed the federal government's power both to protect and promote navigation under the Commerce Clause. The navigation authority became the constitutional foundation (though not the limit) for all federal regulation of water use.

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<sup>1</sup> There are many excellent histories of the expansion of the federal government's role in developing and managing the nation's water resources (e.g., Holmes, 1972 and 1979 and Report of the President's Water Resources Policy Commission, 1950).

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Doubt about the scope of the federal government's power to regulate water for uses other than navigation continued to be raised through the 1800s and early 1900s. Because *Gibbons v. Ogden* had linked federal authority under the Commerce Clause with interstate navigation, the Congress explicitly listed navigation protection as an objective of many multiple purpose federal projects, even when navigation control was a minor project purpose. In 1899, the Supreme Court held that the federal government could prohibit a privately constructed dam on the non-navigable portion of the Rio Grande River at Elephant Butte, New Mexico (*United States v. Rio Grande Dam and Irrigation Company*, 1899). The stated reason was the need to protect the navigable portions of the lower reach of the river in Texas, but the real reason was to preserve the Elephant Butte site for a federal dam which would store water for irrigation in New Mexico and guarantee minimum flows to Mexico below El Paso.

Through the middle of the 19th century, both the Congress and the Supreme Court interpreted the federal commerce clause power broadly. The commerce clause has thus been relied on for federal authority to develop water sources for irrigation, hydropower, flood control (*Jackson v. United States*, 1913), and municipal and industrial use, as well as to regulate the use of the nation's waters to prevent environmental degradation and to restore past environmental damage. The spending and war powers have been relied upon as well as the Commerce Clause, but the latter remains the primary source of federal authority to regulate water resources development.

In the past two decades, the Supreme Court has defined the scope of federal powers more narrowly than it did in the 1940s through the 1960s (*United States v. Lopez*), but federal power to manage water resources has not been directly curtailed. The economic use and protection of interstate rivers from environmental degradation continue to fall

within the federal government's historic constitutional power to manage interstate rivers and their tributaries for multiple uses.

### ***Legislative History: The Evolution of Federal Functions and Agencies***

Water institutions reflect three widely accepted policy choices. First, the law should recognize private rights to use water. Second, the need to sustain human life and development means that water must be shared among wide groups of users. Third, there is a public as well as private dimension to water use, and there is an increasing recognition that the resource must be managed for public as well as private objectives. While individuals may have recognized private entitlements to use water, private choices historically have been subjected to public scrutiny to protect other users and the broader interstate and national public interests.

Within this general framework, this chapter discusses the evolution of the federal role in water development and management.

In the late 19th century, the West was a sparsely populated region whose harsh climate was a major barrier to permanent large-scale settlement. It was therefore subject to boom and bust cycles and dependent on development capital from outside the region. About this time, a vision of the region as an egalitarian, irrigated agricultural society captured some public attention. State water law, after considerable trial and error, provided the incentive for investment in irrigation infrastructure, but this was not enough to generate sufficient capital to build and sustain the desired irrigation projects. Such an undertaking created the demand for the resources of the federal government. Accordingly, with the Reclamation Act of 1902, the Congress assumed primary responsibility for developing an irrigation society in the West.

The 1902 legislation initially made the federal government a short-term lender, but the irrigation economy was more fragile than originally anticipated. Federal support gradually increased, and the government evolved into a major financier of regional infrastructure. Project purposes expanded to include flood control, navigation, and hydro-power generation. In the 20th century, the federal government has financed much of the infrastructure to supply the West with water for irrigation and municipal and industrial uses, and to minimize flood damage and improve navigation. The federal financial contribution to water resources development in this century, especially since the late 1930s, has been substantial. The Bureau of Reclamation (Reclamation) alone has been responsible for the construction of 133 water projects in the western United States, at a cost of \$21.8 billion (General Accounting Office, 1996).

In addition, early in the 20th century, during the progressive conservation era, the Congress began establishing multiple federal agencies with distinct missions. The Corps of Engineers' (Corps) flood control mission expanded, and the passage of the Reclamation Act underscored the federal commitment to help settle and develop the West through federally financed projects. The Congress eventually created more than a dozen agencies with management and regulatory authority over water.

The federal government assumed other responsibilities, in part because the geography of river basins (most of which are interstate or international in scope) has encouraged it to play a large, but not exclusive, role in water management. In addition, the federal government protects claims and uses that are not well defended by the states, such as Native American and environmental claims. The federal court also provides a forum, such as the Supreme Court's original jurisdiction, for the adjudication of interstate claims. Supreme Court adjudication favors prior uses, and states have used interstate compacts to allocate river basins to protect

both existing and future uses. By and large, water has been allocated for specific uses rather than managed according to comprehensive or multiobjective plans.

To provide secure rights adapted to an arid climate, the western states largely either abandoned the common law of riparian rights in favor of an exclusive system of prior appropriation or created dual appropriative-riparian systems. In the West today, riparian rights remain important primarily in California, Nebraska, and Oklahoma (tribal rights were not traditionally considered by states in their allocation schemes). Western water law creates relatively certain private rights to use water. Prior appropriation allows water to be used where it is needed; creates quantifiable, enforceable rights; and limits the right to water to the amount actually applied to beneficial use.

The federal government has left it to the states to develop comprehensive plans to guide the choice and timing of water development projects or the allocation and distribution of water in federal projects. It has made attempts to better coordinate water policy decisionmaking, such as it did with the Water Resources Council. However, the decisions about the construction of water projects were often left to the political process.

The federal role continues to be fragmented, with multiple agencies, each with specific and narrow legal mandates and constituencies, managing or controlling certain aspects of water uses. For example, Reclamation built and manages specific projects primarily for the benefit of agricultural water users, although this mission has broadened considerably in recent decades. The Corps manages projects, maintains navigation channels, and operates and maintains reservoirs and levees to control floods and for such incidental uses such as hydroelectric power generation. The Fish and Wildlife Service (Service) and the National Marine Fisheries Service administer the Endangered

# *Major Federal Laws and Actions Affecting Western Water Resources*

## **1. Navigation**

**1824 - *Gibbons v. Ogden*** (holding that constitutional authority over interstate commerce gave the United States the power to regulate commerce-related navigation within states)

**1824 - General Survey Act** (authorizing the President to use the Army Corps of Engineers to develop plans for building roads and canals "of national importance")

**1826 et seq. - Rivers and Harbors Acts** (authorizing specific projects to make rivers and harbors more usable for navigation)

**1890/1899 - Congressional Acts** (Regulating construction of bridges, wharves, piers, channels, and harbors; diversions of water; and deposits of refuse and other materials in navigable waters)

## **2. Flood Control**

**1874/1879** - Congressional commissions investigating flood control for the Mississippi River

**1893** - Congressional commission investigating flood control for the Sacramento/San Joaquin

**1917 - Flood Control Act** (authorizing Corps' construction of flood control works on the Mississippi and Sacramento Rivers)

**1928 - Flood Control Act of 1928** (establishing the Mississippi River and Tributaries Project)

**1936 - Flood Control Act** (making flood control a national responsibility)

**1944 - Flood Control Act** (greatly expanding the Corps' flood control program)

**1954 - The Watershed Protection Act** (authorizing USDA assistance for flood control projects in small watersheds)

## **3. Hydropower**

**1879 et seq.** - Congressional approval of individual private dams for hydropower

**1890** - Secretary of War review of dams for congressional approval

**1906 and 1910 - General Dams Acts** (establishing application procedures for nonfederal hydropower development on navigable waters)

**1920 - Federal Power Act** (establishing a permanent commission to license nonfederal development of water power on navigable waters and public lands)

## **4. Irrigation Water Supply**

**1870s/1880s** - Powell/Hayden/other surveys

**1877 - Desert Land Act** (authorizing sale of 640-acre tracts of arid lands in western states to people who would irrigate them within 3 years)

**1894 - Carey Act** (authorizing grants of federal public lands to states to encourage their settlement and irrigation)

**1902 - Reclamation Act** (providing for federal construction of water projects for irrigation)

## **5. Urban Water Supply**

**1906 - Town Sites Act** (authorizing delivery of Reclamation project water to nearby towns)

**1920 - Sale of Water for Miscellaneous Purposes** (authorizing delivery of Reclamation project water for "purposes other than irrigation" under certain conditions)

**1939 - Reclamation Project Act - § 9c** (authorizing contracts for municipal water supply or miscellaneous purposes)

**1944 - Flood Control Act** (authorizing contracts with states, concerns, or individuals for surplus water from Corps' reservoirs)

**1958 - Water Supply Act** (authorizing storage in either Reclamation or Corps' projects for present or future municipal or industrial water needs)

## **6. Multiple Purposes**

**1927 - Rivers and Harbors Act** (authorizing the Corps to prepare multipurpose plans to improve navigation, water power, flood control, and irrigation—the so-called 308 plans)

**1928 - Boulder Canyon Project Act** (project purposes stated as controlling floods, improving navigation, regulating flows, providing storage and delivery of water for beneficial uses, and generation of electrical energy)

(See "Federal Laws and Actions," next page)

## ***Federal Laws and Actions (continued)***

### **6. Multiple Purposes (continued)**

**1939 - Reclamation Project Act - § 9(a)** (project costs to be allocated among different functions; no reimbursement for navigation and flood control features)

### **7. Fish and Wildlife/Recreation**

**1934 - Act to Promote Conservation of Wild Life, Fish and Game** (directing consideration of opportunities to use federally constructed impoundments for fish-culture stations and for migratory bird resting and nesting areas and to provide passageways for fish migration)

**1944 - Flood Control Act - § 4** (authorizing public park and recreation facilities at Corps' water projects)

**1946 - Coordination Act** (providing consultation requirement for new federal water projects with Fish and Wildlife Service and state wildlife agency)

**1948 - Fish and Wildlife Coordination Act** (further amending and naming the 1934 and 1946 acts)

**1965 - Federal Water Project Recreation Act** (promoting planning of federal water projects to include opportunities for recreation and fish and wildlife enhancement)

### **8. River Preservation**

**1964 Wilderness Act** (setting aside public land areas as wilderness areas, subjecting any future water development therein to Presidential approval)

**1968 - Wild and Scenic River Act** (setting aside designated river segments from further impoundment)

### **9. Consider/Mitigate Adverse Environmental Impacts of Federal Actions** (especially related to fish and wildlife)

**1969 - National Environmental Policy Act** (establishing a federal policy of productive harmony between nature and man's activities and requiring federal agencies to assess the environmental impacts of proposed major actions)

**1976 - Federal Land Policy and Management Act** (subjecting rights-of-ways across federal lands to terms and conditions minimizing damage to scenic and aesthetic values and fish and wildlife habitat and otherwise to protect the environment)

**1976 - National Forest Management Act** (requiring protection of water bodies and their fisheries from adverse effects of timber harvesting)

**1986 - Electric Consumers Protection Act** (requiring FERC to give equal consideration to the purposes of energy conservation; the protection, mitigation of, damage to, and the enhancement of fish and wildlife (including related spawning grounds and habitat); the protection of recreational opportunities; and the preservation of other aspects of environmental quality in its hydropower licensing decisions)

**1986 - Water Resource Development Act** (providing for fish and wildlife mitigation at Corps' projects)

**1992 - Reclamation Projects Authorization and Adjustment Act** (among other things, establishing a mitigation commission for the Central Utah Project and requiring fish, wildlife, and habitat restoration associated with the Central Valley Project)

### **10. Water Quality Protection**

**1972 - Federal Water Pollution Control Act Amendments** (prohibiting pollutant or dredge and fill discharges into water without a permit)

**1976 - Resource Conservation and Recovery Act** (regulating disposal of hazardous wastes)

**1976 - Safe Drinking Water Act** (establishing standards for publicly provided drinking water)

**1980 - Comprehensive Environmental Response, Compensation and Liability Act** (requiring cleanup of hazardous wastes)

### **11. Endangered Species Protection and Recovery**

**1973 - Endangered Species Act** (prohibiting federal actions likely to jeopardize the continued existence of protected species as well as private actions harming or killing such species)

### **12. Tribal Reserved Water Rights**

**1908 - *Winters v. United States*** (creation of an Indian reservation impliedly reserves sufficient quantities of water to fulfill the purposes of the reservation with a priority date at least as early as the creation of the reservation) **#**

Species Act (ESA) and the Fish and Wildlife Coordination Act (FWCA) to protect fish and wildlife whose survival may be jeopardized by a federal activity or where private actions, such as a diversion, threaten to harm the species when water is removed from stream channels. More recently, the Clean Water Act allowed a new federal agency, the Environmental Protection Agency (EPA), to set water quality standards for and control discharges into surface waters, but specifically exempted agricultural return flows as nonpoint sources.

The fragmentation of federal responsibilities in this area is illustrated by the following statement:

*In essence, the complex federal executive responsibilities for water resources reflect comparably complex congressional legislative responsibilities, which in turn mirror the multiple and complex ways in which water resources affect social and economic activities* (Congressional Research Service, 1997).

A more complete discussion of the federal agencies and their respective responsibilities over aspects of water development and management can be found in chapter 5 of this report. The Congressional Research Service of the Library of Congress prepared a memorandum and a table discussing the jurisdiction of congressional committees and executive agencies over western water resources. (See appendix A of this report.)

## Navigation Protection and Enhancement

Navigation protection and enhancement constitute a major federal water function because the nation's major rivers are interstate and are under the jurisdiction of the Corps, although the Coast Guard has some responsibility for inland navigation management. Navigation plays two important roles in water management. First, as discussed above, it

is the constitutional foundation of federal power to manage water resources. Second, the Corps' navigation mission provides an example of a limited form of river basin management; the Corps must plan and manage on a basinwide scale to ensure that its flood control and navigation missions achieve their objectives and do not conflict with each other or other agencies' activities, such as ESA compliance, which may be occurring on the same river.

The protection and enhancement of navigation have been an important federal function but have never played a major direct role in the settlement of most of the West. In general, navigation played a minor role in the development of the West because much of the region was settled by overland wagon trains and then by the transcontinental railroads constructed after the Civil War. Navigation plays a limited but diminishing role in the modern West because most crops and other commodities are moved by rail or truck, although the Sacramento, Columbia-Snake, and Missouri Rivers continue to be used for navigation.

As a nonconsumptive use, navigation usually is consistent with other water uses, but navigation projects do have environmental costs. Locks and reservoirs may destroy riverine ecosystems. Sometimes navigation conflicts with other possible uses of a river's supply, forcing the Corps to balance its duty to operate projects to maintain a sufficient navigation channel in the river with the protection of other values that require a different flow release pattern.

## Flood Control

The history of United States flood control in this century is, in part, the rise of the public expectation that floods and flood damages are largely preventable. Flood control was initially a local responsibility, although the Corps' navigation channel improvement projects also often had flood

control benefits. The Corps was first authorized to expend federal monies on levee construction to supplement local contributions in 1890, although the Corps had concluded as early as 1875 that state and local levee construction efforts were too uncoordinated to be effective.

The federal role was growing in the 1920s. In 1928, the Congress authorized \$325 million for levee and other construction in the lower Mississippi Valley without local contributions (President's Water Resources Policy Commission, 1950). Until 1936, the federal government followed the traditional strategy of levee construction and maintenance. Then the Depression era combined the need for economic relief through public works with an optimistic faith in large-scale engineering works to foster human progress, culminating in a program of larger flood control projects.

In 1936, flood control responsibility was split between the United States Department of Agriculture (USDA) and the Corps (with most responsibility and projects allocated to the Corps), and federal policy combined levee construction and maintenance with upstream retention reservoirs to hold back winter and spring runoffs. The USDA, through the Soil Conservation Service, was authorized to finance small dams on the upper reaches of watersheds. The Corps was given the authority to construct large multiple-purpose dams on large navigable rivers and their tributaries.

Today, the responsibility to prevent and mitigate flood losses is distributed among several federal agencies and a variety of state and local agencies, and federal policy has, in effect, subsidized development in flood plains as described in chapter 3. This policy has long been questioned, but the federal government did little, either directly or indirectly, to try to divert vulnerable urban development from likely flood paths. Federal flood control programs have provided a high level of protection for those at risk from floods, but they also produced a moral

hazard problem. ("Moral hazard" is a term used by economists to describe the tendency of those insured to "relax his [or her] efforts to prevent the occurrence of the risk that he has insured against because he has shifted all or part of the expected cost of the risk to an insurance company [Posner, 1992]). Flood protection efforts create a moral hazard problem because the use of flood plains increases as the perception of risk—either of physical damage or uncompensated damage—decreases.

The federal flood insurance program of 1968 recognized that structural measures did not prevent flood losses and that there was a need to limit flood plain use to land uses and structures that were best adapted to floods and to share the risks of flooding between the federal government and those who chose to locate in flood-prone areas. The program now basically requires that the Federal Emergency Management Agency develop local community flood risk maps and that communities enact appropriate land use measures. Communities must designate floodways, which are the portions of the 100-year flood plain required to carry the water of a 10-year flood without raising the surface elevation of the flood any more than 1 foot at any point in the flood plain. All fill, construction, and development must be prohibited in this area. This program has led to an expansion of river corridor parklands and to the better integration of flood plain greenbelts into new development decisions. However, many developments and urban redevelopments continue to crowd as close to floodways as possible to capture the amenity value of this resource.

### Water for Agriculture

Federal support for reclamation projects has played a major role in the development of the modern West. As was detailed in chapter 2, irrigated agriculture is both a major contributor to the region's productivity and a unique culture. A recent National Research Council report (1996a) observes:



## *Repayment of Reclamation Water Projects*

Historically, construction of Reclamation water projects was funded from the federal treasury. What follows is a brief description of how the costs of building projects get repaid by those receiving project benefits, how water contracts are constructed, and how they are renewed. This is a general description, which does not account for the many details or variations among projects.

**Cost Allocation.** Reclamation water projects generally have multiple beneficiaries—agricultural water users, municipal water users, hydroelectric power users, and recreation visitors. Project costs are assigned to each beneficiary according to the cost of constructing the associated project features (e.g., hydropower is assigned part of the cost of the dam and all of the cost of the powerplant; irrigation is assigned part of the dam's cost plus all of the cost of canals and other distribution facilities). This allocation is the starting point for determining how much each group of beneficiaries must repay.

**Repayment.** Several laws have defined how the allocated costs of a water project must be repaid by the various beneficiaries.

**Irrigation.** The Reclamation Project Act of 1939 provides that the costs assigned to irrigation be repaid only up to that amount which farmers can cover from the increased income received from irrigated (as opposed to dryland) farming. Contracts for the repayment of the irrigation costs are based on the farmer's payment capacity that remains after the project's operation and maintenance costs have been deducted.

Two types of contracts for repayment are allowed under the 1939 Act. "Repayment contracts" which are authorized by Section 9(d), provide for a fixed obligation of the irrigation district. At the end of the repayment period, the debt obligation is fulfilled, but the other contract provisions continue in perpetuity. These contracts usually require approval by the members of a district for adoption or revision. Contracts usually are for 40 years, but this varies from project to project.

Section 9(e) of the 1939 Act provides for "water service contracts" which may be for terms of up to 40 years. Under these contracts, irrigators only pay for water actually delivered to the farm in any given year. Current policy requires review of payment capacity at 5-year intervals in these contracts. There are a number of other rate setting and cost-recovery procedures in use for water service contracts.

It is Reclamation's policy to collect 100 percent of remaining payment capacity after operation, maintenance,

and replacement (OM&R) costs have been deducted. No reduction in the annual payment on the construction obligation for repayment (Section 9(d)) contracts will be made to account for increases in OM&R costs. For water service contracts under Section 9(e), the current OM&R costs will be reflected as a part of the reanalysis of payment capacity at 5-year intervals. Beginning in 1994, Reclamation policy restricted contract length to 25 years.

In most of Reclamation's operating area, assistance is available from federal power revenues to repay the project costs that are beyond the irrigators' ability to pay. Irrigators pay the construction costs up to their ability to pay, and assistance from power revenues pays the balance of the irrigation obligation. All construction costs allocated to irrigation are repaid without interest.

**Municipal and Industrial (M&I) Water.** Payment of project cost by those receiving M&I water is most often governed by the Water Supply Act of 1958. This Act permits storage capacity to be included in any Reclamation or Corps reservoir for present or anticipated M&I demand. M&I water rates are set to repay the full cost allocated to M&I supply, with interest, generally over a 50-year period. However, up to 30 percent of the cost of the project storage needed to meet future demand can be deferred, subject to repayment within the life of the project or a 50-year repayment period. Interest charges on these deferred costs may be waived for a period up to 10 years, and initiation of construction repayment may be deferred until the block of water allocated to future demand is first used.

**Hydropower.** Power generation was included in many projects to provide energy to pump project water. Energy in excess of project demands is permitted to be sold to "preference customers"—public entities, such as rural electrification associations and municipalities. Most Reclamation hydropower projects are incorporated into basinwide accounts for power repayment and marketing. The power rate is set at a level to cover, over 50-years' time, the project costs (both capital and O&M) assigned to hydropower, plus the portion of irrigation repayment that is beyond irrigators' ability to pay. Costs allocated to hydropower are reimbursable with interest.

**Recreation and Fish and Wildlife Enhancement.** The Federal Water Project Recreation Act of 1965 (P.L. 89-72) provided the first general authority for facilities at Reclamation projects to be designed specifically for recreation and fish and wildlife purposes and financed through cost sharing with a nonfederal entity. Prior to this,

(See "Repayment," next page)

## ***Repayment (continued)***

specific project legislation addressed recreation and fish and wildlife cost allocation and repayment matters. Under Public Law 89-72, 50 percent of the construction costs allocated to these purposes are repaid with interest by a nonfederal entity over a 50-year period. Most recreation areas are turned over to other federal and nonfederal agencies for management, and those agencies incur the O&M expenses. The Water Resources Development Act of 1974 (P.L. 93-251) amends P.L. 89-72 and provides that only 25 percent of the costs allocated to fish and wildlife enhancement are to be repaid with interest.

**Fish and Wildlife Mitigation.** Where a project creates impacts on fish and wildlife resources that must be mitigated, the costs of mitigation measures are assigned proportionally to the various project purposes and repaid using the procedures applicable for each respective function.

**Flood Control.** The Flood Control Act of 1936 established the philosophy that flood control was for the general welfare of the region and the nation and required that the nonfederal interests share in the development costs, such as providing lands and O&M of the project works. The Flood Control Act of 1938 repealed the requirement for such participation. The Water Resources Development Act of 1986 required a 25-percent cost share from local beneficiaries, increased to 35 percent in 1996.

**Existing Contracts.** To administer project water, Reclamation currently utilizes approximately 9,000 project repayment and water service contracts, including temporary water service contracts and contracts with individual water users. Of these, about 2,700 are considered to be major contracts. These contracts provide water service to 10.9 million acres for agricultural lands and 800,000 acres of urban and suburban lands, thus providing benefits to 30.9 million people. In the next 5 to 7 years, numerous contracts will be due for renewal, including many in the Central Valley Project of California.

**Contract Renewals.** Water contract renewal has always been a concern of water users and, more recently, is a concern of those who feel that some types of water use should not be continued or should be modified as contracts expire.

One of the purposes of the 1956 Act (Administration of Contracts under Section 9, Reclamation Project Act of 1939, July 2, 1956) was to address the concerns of irrigation districts related to renewal of water service contracts. The objections of the districts were: "(1) that no assurance can be given in the contract itself or any other document binding upon the government that the contract will be renewed upon its expiration; (2) that the water users who have this type of contract are not assured that they will be relieved of payment of construction charges after the government has recovered its entire irrigation investment; and (3) that the water users are not assured of a permanent right to the use of water under this type of contract."

In partial response to these objections, Subsection 1(1) of the 1956 Act allows the inclusion of a provision in water service contracts for the renewal of the contract. Subsection 1(2) allows for the conversion of a 9(e) water service contract to a 9(d) repayment-type contract, provided certain conditions are met. Currently, Reclamation and the Office of the Solicitor are reviewing a number of questions with respect to interpretation of this Act and its effect on the contract renewal process.

**Contract Program Review.** Given the large number of contracts coming up for renewal in the near future, Reclamation is currently reviewing legal requirements and internal procedures associated with its contracting program. This review is critically important, given the strong interest in contract renewal by the historic beneficiaries as well as environmental and tribal interests. Part of the impetus for the review stems from legal actions concerning contract renewal, the most notable being suits brought by the Natural Resources Defense Council over renewal of the water service contracts for the Friant Unit of the Central Valley Project. This suit raised questions about the need to address ESA issues and conduct NEPA studies before reaching a decision to renew. Reclamation's review of policy will address how the contract renewal process can address both the need for predictability for water users seeking renewal and the flexibility to adjust water use to changing environmental needs and social values in the West. #

*...if society accepts that irrigation is more a culture—the way people live and part of the national identity—it's logical for the public to absorb a significant share of the responsibility for the activity in the name of the national interest. Thus society shares the costs and uncertainties by providing various subsidies to farmers, which in turn subsidize the costs of food and fiber to consumers.*

Reclamation has been the primary federal agency responsible for the promotion of an irrigation economy in the West, but the promotion of this economy has also been a part of the mission of USDA and a secondary benefit from Corps projects. The federal reclamation program created in 1902 (Reclamation Act, 32 Stat. 388) was to be used for:

*...the construction and maintenance of irrigation works for the storage, diversion, and development of waters for the reclamation of arid and semiarid lands in the said States and Territories.*

The history of the settlement and development of the West is one of constant adaptation to the reality of arid or semi-arid lands through agronomic and institutional experimentation, and the Reclamation Act of 1902 represented a recognition that substantial federal support would be necessary to sustain settlement in the region.

The West initially was dismissed as an uninhabitable desert, but exploration changed this perception by the 1840s. Settlement was initially confined to fertile areas of California and Oregon or to river valleys with an adequate supply of water for small-scale irrigation. The lands immediately west of the lower Missouri and the Red River basins in Minnesota and North Dakota, for example, received from 20-25 inches of rain a year. In 1847, the Mormons migrated from Nauvoo, Illinois, to the

Valley of the Great Salt Lake and began irrigating much more arid lands. The settlement of other arid areas such as Colorado followed.

The federal government initially tried to encourage western settlement through the disposal of public lands, assuming that individual enterprise would adapt itself to the region's climate. Much public land policy from 1862 to 1902 can be seen as an unsuccessful attempt to develop a land disposal scheme that would support non-Indian settlement and stimulate private enterprise in the more arid parts of the West. The Homestead Act of 1862 was designed for humid (or at best semi-arid) areas and failed to attract sufficient settlers to the more arid regions of the West. The Congress increased the incentives by the passage of the Desert Land Act of 1877. The Act allowed settlers to acquire 640-acre tracts of nonmineral, nontimbered land at \$1.25 an acre if they reclaimed the land through irrigation within 2 years after entry; but as a leading public land historian concluded, the Desert Land Act:

*...was abused from the outset by cattlemen and other groups anxious to gain ownership of water rights. . . 159,704 entries on 32,803, 914 acres of desert land, and 46,999 final entries for 8,645,749 acres indicate that many tried but few succeeded in fulfilling the requirements of the Desert Land Act (Gates, 1968).*

The agricultural settlement of the West proceeded on two tracks—dryland farming and irrigated agriculture. Except for southern California, which developed a fruit and vine culture modeled on the Mediterranean, irrigated agriculture was initially developed to provide winter feed to support the cattle industry. Dryland farming—cultivation with a minimum of water—was adopted to grow wheat in the upper Great Plains and in the dry areas of the Pacific Northwest. The story of the successful introduction of hard wheat to the upper Missouri region and its survival in the 1930s is a classic

example of adaptation to a semi-arid climate without supplementing existing supplies of water. Russian and German Mennonites brought drought-resistant Turkey Red wheat from the Crimea; later, a far-sighted USDA employee imported a better strain from Russia and created new pasta markets for this hard variety.

The United States decided to support the fledgling irrigation economies developing in the West by federally financed water projects. Irrigation had become a national political issue in the 1890s and was touted as the means to create a civilized society of farmers. The success of the Mormons in Utah became the model for similar collectives, such as secular, communal efforts in Colorado, California, and Washington. The Anaheim colony in southern California and Union colony in what became Greeley, Colorado, were the first two major irrigation colonies, and they induced the formation of larger, less idealistic irrigation projects backed by eastern and foreign capital (Dunbar, 1983). These projects were intended to be self-sustaining—and, in many cases, profitmaking—but many were not. Too often, speculation, rather than bona fide occupation by resident farmers, and drought cycles combined to bankrupt many canal companies.

Federal support for irrigation emerged after the federal government was unable to develop a public land policy to induce sufficient settlement of the West, and states' efforts to finance irrigation projects or to induce the creation of irrigation districts were not successful enough to create sustainable irrigation economies. The 1902 Reclamation Act was passed when President Theodore Roosevelt asked opponents, mainly fiscally conservative eastern Republicans, not to oppose the bill. This, along with a "veiled threat to veto the river and harbor bill," cleared the way for its passage (Pisani, 1992). Until the New Deal, the actual impact of the Reclamation Act was small. Initially, federal funding was limited to the construction of storage and distribution facilities to support individual

reclamation projects, many started by private enterprise. Supporters predicted that 60-100 million acres would be irrigated, but the thirty projects created during the first 6 years of the Act totaled about three million acres, and much of this land had been irrigated prior to 1902.

The New Deal fundamentally transformed the Reclamation program from a community-based effort to a regional water development program. Larger carryover storage reservoirs were constructed to support irrigated agriculture as well as urban growth. Hoover Dam was constructed to firm up supplies for both the Imperial Valley and Los Angeles, and it became the model for the construction of large multiple-purpose projects during the Depression and into the 1960s. The competition for scarce resources was solved by supply augmentation and the occasional reallocation of existing supplies.

Historically, the major tension in Reclamation philosophy and practice was between the original social vision of a West peopled with small farms and the reality that, in many places, that vision was not economically feasible. The history of acreage limitation illustrates the tension between original intention and the recognition that a different adaptation had occurred, especially in California. The original reclamation program contemplated that individual project costs would quickly be repaid in 10 years by the beneficiaries: the program limited water deliveries to 160-acre tracts or 320 acres when both a husband and wife held title. Most projects could not meet the repayment obligation, so the repayment period was progressively extended. Other assistance was provided through interest-free repayment charges and use of an "ability to pay" standard for cost recovery. This allowed Reclamation to shift some of the repayment obligations from irrigators to hydroelectric power generation.

## Native Americans

Native American tribes and nations face a difficult paradox. The tribes and nations have rights to substantial quantities of water, but they have not been able to enjoy this water. While tribes share the western landscape, unlike the major beneficiaries of federal water resources development, by and large, they have not shared in the federal government's water largesse from 1902 to the present.

Federal support for Native American irrigation dates to 1867. During the allotment era (1888-1932), some 150 reservation projects irrigating 362,000 acres were constructed when federal policy was to turn "nomadic" peoples into "pastoral" peoples (Sly, 1988). An unpublished 1975 Senate Report (Sly, 1988) estimated that \$201 million had been expended to irrigate about 648,000 acres and that only 16 Native American projects could be considered major. The gap between Native and non-Native American water expenditures and the difficulties that tribes face in using water for nonirrigation purposes has been a continuing source of frustration to them. No feasible solution is currently on the federal policy agenda.

The federal government holds a "trust" responsibility for Indian tribes. The trust is a product of Chief Justice John Marshall's creative effort to recognize the indigenous nations' and tribes' inherent sovereignty within the context of a wider national government. In three seminal decisions—*Johnson v. McIntosh* (21 U.S. (8 Wheat.) 543 (1823)), *Cherokee Nation v. Georgia* (30 U.S. (5 Pet.) 1 (1831)), and *Worcester v. Georgia* (31 U.S. (6 Pet.) 515 (1832))—he rationalized the federal government's superior power, now much contested by many Native Americans. Marshall held that the purpose of the exercise of the power was to fulfill the government's duty to protect the tribes' treaty rights. As applied to water, the trust responsibility requires that the

federal government protect the tribes' continued enjoyment of their existing *Winters* rights.

Consequently, the extent of tribal claims to western water resources is substantial. In 1984, the Western States Water Council estimated that tribal reserved water rights might extend to as much as 45 million acre-feet. In most cases, tribal rights are senior to other water rights established under state laws. However, the process of defining particular uses and quantifying the amount of the reserved water rights held by each tribe in the West has moved slowly. In 1983, the Supreme Court determined that tribal water rights are subject to determination in state general stream adjudication processes.

As described in the chapter 3 sidebar, "Tribal Water Rights Settlement," these processes are complex and are proving to take much longer to conclude than expected.

Indian water rights are one of the tribes' most important assets.<sup>2</sup> The United States holds a trust responsibility to protect tribal water rights from infringement by others. In instances in which a tribe decides to seek quantification of its rights or in which a state seeks to join a tribe in a stream adjudication process, the U.S. must represent and protect tribal interests in its rights. As discussed in

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<sup>2</sup> In *United States v. Adair*, 732 F. 2d 1394 (9th Cir.), cert. denied, 467 U.S. 1252 (1985), the Ninth Circuit held that the Klamath Tribe's treaty intended to reserve water necessary to support the hunting and fishing activities relied on by the tribe. The Ninth Circuit also upheld the existence of a reserved right to support the fishery on the *Colville Reservation* (*Colville Confederated Tribes v. Walton*, 752 F.2d 397 (9th Cir. 1985)). Also, the Washington Supreme Court upheld a decision in the Yakima River adjudication, finding a reserved water right for "the minimum instream flow necessary to maintain anadromous fish in the [Yakima] river, according to annual prevailing conditions." *State Dep't of Ecology v. Yakima Reservation Irrigation District*, 850 P.2d 1306 (Wash. 1993). The Wyoming adjudication, on the other hand, found that the Wind River Tribes could not claim reserved rights on the basis of fisheries management.

## ***Federal Reserved Water Rights at Zion National Park***

Federal reserved water rights for surface water and groundwater at Zion National Park were recognized in a signing ceremony on the banks of the North Fork of the Virgin River in December 1996. Secretary Babbitt, Utah Governor Leavitt, Zion Superintendent Falvey, and representatives from Washington and Kane Counties signed the agreement, recognizing the first federal reserved water right for a national park in Utah. The agreement, following 5 years of negotiation, secures instream flows and groundwater to protect the Virgin River and hanging gardens while providing a dependable water supply for local communities.

The NPS Water Resources Division initiated studies in 1987 to support water rights claims in the Virgin River Adjudication and to address the threat of 37 proposed upstream dams. Fourteen studies were conducted to estimate the amount of water necessary for park purposes and to maintain unimpaired water resources. Investigators studied flow, including water and sediment discharge; age and origin of groundwater; channel forming processes; riparian vegetation; native fisheries; aquatic organisms; hanging gardens; aesthetics; and recreational use.

Between 1987-90, little progress was made in settlement due to traditional state and federal government rivalries and a lack of scientific data. In 1992, negotiations to explore settlement options were reopened. In 1993, study results were presented to the state and Washington County Water Conservancy District (WCWCD). Scientists and historians presented data and information to support water rights for instream flows and groundwater to protect Zion ecosystem values.

Equipped with a new understanding about the dependence of water-related sources on streamflows and groundwater in the park, NPS, the state, and WCWCD formed a technical team to develop and evaluate settlement proposals and reached agreement on settlement concepts in May 1996.

The final agreement recognizes a federal reserved water right to all the unappropriated flows in and above the park and allows valid existing uses to continue. It limits total depletion but allows a small amount of water development above the park. Construction of proposed mainstem dams on the East and North Forks of the Virgin River and a transbasin diversion to Cedar City are prohibited. Future water supply needs for administrative purposes at Zion are defined. The agreement also establishes a 2-mile groundwater protection zone, restricting development of high capacity and high volume wells on Zion's boundaries.

The agreement will be effective upon completion of a land exchange between BLM and WCWCD for public lands at the proposed Sand Hollow Reservoir site downstream of Zion and private property above the park. The exchange removes a longstanding threat that WCWCD would construct Bullock Dam above Zion and allows it to develop a reservoir downstream of the park to provide water for St. George, Utah. The historic agreement will then need to be confirmed by the state adjudication court before water rights are decreed. Should objections arise, Utah and Washington and Kane Counties have agreed to stand "shoulder-to-shoulder" with NPS in support of the settlement.

At the signing ceremony, the Secretary and the Governor praised the work of the negotiation team and encouraged the continued use of "good science" and cooperative efforts to solve complex water rights issues in Utah. This agreement forever protects water resource values at Zion and establishes a process that can be used to complete settlements of this nature at other Utah parks. It is doubtful that NPS could have secured this impressive set of protections through litigation. #

— William R. Hansen and Daniel J. McGlothlin, National Park Service, Water Resources Division

chapter 3, many tribes have chosen to pursue negotiated settlements of their rights rather than adjudication in federal or state court.

## Hydropower

Hydroelectric power generation is a major nonconsumptive use of water, and generation of hydroelectric power has become one of the central issues of water management. Hydropower generation is both a source of and solution to environmental problems. Demand for power may be inconsistent with other flow needs of the project, such as for irrigation or for ecosystem restoration; however, the alteration of generation patterns may be a source of restoration flows, and hydropower revenues are a source of restoration and mitigation funds.

As the 1950 Report of the President's Commission on Water Resources Policy observed, "the drive to make economical use of capital investment has placed growing emphasis upon power as the principal and often the only feasible means for recovering project costs." Power revenues are also a potential source of basin funds which can be used to redistribute regional development monies to substitute for lost water project development opportunities.

Three controversies have surrounded hydroelectric power generation: (1) the public versus private debate; (2) the debate over whether to preserve or dam up the canyon; and (3) the modern conflict between hydropower generation and protection of environmental and recreation resources.

Federal power policy was a major political issue from the turn of the century through the 1950s. One key question was: Who would capture the benefits of prime damsites—the federal government or private utilities? The Federal Power Act of 1920 settled a long battle over public versus private

control by allowing private access to hydroelectric sites, subject to a federal license. Between 1920 and the 1950s, additional compromises were reached which have produced a mixed system of privately and publicly generated power.

Toward the end of the major dam-building era, environmentalists began to challenge proposals to dam scenic canyons on aesthetic and, later on, economic and other grounds. Starting in the 1950s, the need for large dams on the nation's rivers came into question. The modern environmental movement grew, in part, out of fights between those favoring dam construction and those opposing dams on the Colorado River system.

## *Federal Conservation Programs*

The passage of the Wild and Scenic Rivers Act in 1968 restricted the construction of large federal and privately licensed dams on the prime undammed rivers (Fairfax et al., 1984). The immediate genesis of the legislation was a 1965 study by the Secretaries of Agriculture and Interior which recommended that several rivers be protected from dam construction. Accordingly, the original legislation was aimed primarily at stopping new dams. Although conservation organizations succeeded in broadening the focus to river and river corridor protection and management between 1965 and 1968 (Tarlock and Tippy, 1970), preventing construction of new dams remained its focus (Hiser, 1988).

The Wild and Scenic Rivers Act recognizes three classes of free-flowing rivers for protection: pristine; relatively undisturbed scenic; and developed recreation. Rivers may be designated by the Congress or by the Secretary of the Interior upon the request of a governor. In addition, many states have enacted similar Wild and Scenic Rivers Acts. The actual impact of the act on United States rivers is small, but the act is the first recognition that the preservation of free-flowing rivers is a federal

policy. Although 600,000 river miles in the U.S. are affected by dams, only 10,000 river miles are protected by the Wild and Scenic Rivers Act.

## Pollution Control and Environmental Regulation

The federal interest in water pollution prevention began in 1899 with the passage of the Refuse Act, which charged the Corps with keeping the nation's navigable rivers free of obstructions and discharges that might impair commerce. The Corps, which was the first agency directed to prevent water pollution, was given the subsequent regulatory authority to stop all discharges into the nation's waters under the 1924 Oil Pollution Act. (This mission predates the Corps' flood damage reduction mission.) Between 1948 and 1972, the control of water pollution evolved from a local and state responsibility to a national one, but the focus was on humid industrial regions rather than the arid West. A new agency, the EPA, was created in 1970 to administer the federal pollution programs. Existing agencies such as the Service and the Corps were given expanded environmental mandates—the ESA and Section 404 of the Clean Water Act are the best known. Since the 1970s, EPA has set and enforced uniform environmental quality standards which impact the use of water; the National Environmental Policy Act (NEPA) of 1969 has applied to a wide range of both new and re-engineered existing projects.

The Federal Water Pollution Control Act and subsequent amendments, popularly known as the Clean Water Act, divided pollution sources into point and nonpoint sources and established a zero discharge goal for all surface point source discharges.<sup>3</sup> The Congress established a permit

system for point source discharges and delegated to EPA the authority to establish effluent limitations for categories of point sources. The limitations were subject to progressively higher levels of technology resulting in the development and adoption of technologies that would reduce waste discharges and encourage dischargers to adopt production changes to reduce the waste stream.

The regulatory aspect of the Clean Water Act was aimed primarily at the elimination of the major industrial and municipal discharges. Riverflows in the East are usually near average, except during relatively short-lived droughts; thus, most streams have a natural assimilative capacity to handle wastes that can be factored into discharge permits. Because such conditions are less common in the West, there has always been disconnection between the Clean Water Act and western water policy. The most familiar is the tension between the use of technology to reduce discharges and the right of downstream water rightholders to return flows. Municipal discharges and irrigation return flows were not historically viewed as pollution, but as a valuable resource. In a celebrated Colorado case (*A-B Cattle Co. v. United States*, 1978), a ditch company unsuccessfully argued that the government's replacement of silty water with clean water was a taking of its water right because the district could no longer rely on the silt to line its canals. Return flows often make up a substantial portion of a stream during low-flow months, and these flows are valuable because they support irrigation and other stream uses.

On the other hand, western irrigators have also benefited from the eastern focus of the program. As mentioned above, agricultural return flows are

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<sup>3</sup> The distinction between point and nonpoint sources is not completely clear because courts have the power to define sources absent a congressional classification; basically, it  
(continued...)

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<sup>3</sup>(...continued)  
reflects the difference between confined and unconfined runoffs. The Congress has exempted agricultural return flows from the point source classification, so most agricultural pollution falls into the nonpoint source category.



exempt from the duty to obtain a discharge permit; generally, most farm runoff is classified as nonpoint source pollution. Nonpoint source pollution is not subject to national technology-forcing standards; instead, nonpoint sources must be addressed through best management practices, and states have considerable discretion to define these practices.

## Fish and Wildlife

The protection of fish, other aquatic species, and migratory waterfowl was secondary when most federal reclamation projects were constructed and private hydroelectric dams were licensed. This is no longer the case.

Early responses to the need for such protection included authorizing agencies to construct fish ladders, create wildlife refuges, and operate reservoirs in a manner consistent with fish and wildlife interests. Fish losses, for example, were replaced with hatchery-bred stocks. Yet, in reality, fish and wildlife interests often were subordinated to water development needs. For example, in 1950, then Attorney General Edmund G. "Pat" Brown of California issued an opinion which concluded that the only water stored in Friant Dam that would be available for fish and wildlife protection would be the "surplus" water left after all municipal and agricultural uses were satisfied. Since Reclamation assumed that all water stored in the dam would be used to supply irrigation water to the Central Valley Project, the opinion effectively stripped fish of any legal protection (Dunning, 1993).

Fish and wildlife protection law has passed through various stages. From 1888 to 1958, fish and wildlife protection was generally a permissible but minor use of water. The Service in the Department of the Interior and the National Marine Fisheries Service in the Commerce Department had the authority to consult with federal and state agencies when a project would impair fish populations. In

1958, the Congress passed the FWCA, which mandated that fish and wildlife receive equal consideration with other project purposes. The NEPA of 1969 subsumed the FWCA, since the environmental impact statement became the primary vehicle to assemble, display, and evaluate fish and wildlife impacts. As the 1973 National Water Commission framed the issue: "[t]he basic need. . . is to assure that fish and wildlife receive full consideration and reasonable protection in all water resource activities where potential damage to these values could occur." Neither the FWCA nor NEPA required a federal or state agency to follow the Service's recommendations. Parity with, rather than superiority to, development values remained the goal until the passage of the ESA in 1973.

The passage of the ESA fundamentally changed the role of the Service and the National Marine Fisheries Service. The act mandates that federal agencies or licensees take all necessary steps to prevent further jeopardy to the species and, in some cases, to recover it. The act provides very few options to balance species preservation against economic and social goals, although the provisions in the 1982 amendments to the act concerning habitat conservation plans (and the subsequent implementation of the "no surprises" and "safe harbor" policies) have created a somewhat more flexible environment for the implementation of the act.

Federal environmental regulations have an indirect rather than direct effect on water rights because these regulations overlay existing rights, posing a particularly acute problem in the West. Many pollution laws have the potential to conflict with the law of prior appropriation because they require reducing discharges which form part of downstream water rights. The protection of endangered fish and wildlife may require flow regimes that are inconsistent with the exercise of appropriative or riparian rights. With respect to tribes, however, the situation is different—in some cases, wildlife

protection measures enhance tribal trust resources; in others, they delay or prevent development of tribal water projects.

## Federal Watershed Management

The watershed, according to Professor George Coggins, is the "key, integrative public resource" (Coggins, 1991). Government efforts aimed at watershed protection on federal lands date back to the first reservations of lands from the public domain in the 19th century. Watershed management practices contrasted between two extremes, such as: (1) prohibiting timber harvests and other activities in order to protect water quality; and (2) removing trees and engaging in other land manipulation in order to increase water yields. In either case, "watershed management not only deals with the protection of water resources, but also the capability and suitability of land and vegetation resources to be managed for the production of goods and services" (Brooks et al., 1991). In other words, "managing for watershed protection mostly consists of affirmative steps, such as reforestation and erosion control projects, combined with the negative actions of forbidding, restricting, or conditioning practices that cause watershed deterioration" (Coggins, 1991).

Accordingly, "watershed" came to be included among the multiple uses for which lands are managed by the USDA Forest Service (Forest Service) and the Bureau of Land Management. The National Park Service (NPS) is obligated to protect watershed resources as part of its preservation mandate. The statutory bases for these agencies' management responsibilities are discussed in the sections that follow.

## Forest Service

Close on the heels of the irrigation movement of the late 19th century came calls for government action to protect the forests. There was a close relationship between the leaders of the emerging reclamation and forestry movements, both of whom believed that protecting forest cover from fires and over-cutting would improve water supplies (Hays, 1959). Indeed, one of the principal proponents of a national reclamation program, Frederick H. Newell, advocated the extension of the national forest system from his position as secretary of the American Forestry Association (Hays, 1959). Gifford Pinchot, the nation's first professional forester and the founding chief of what would be called the Forest Service, joined with Newell in pushing the 1902 Reclamation Act (Hays, 1959).

Irrigators sought to withdraw public forested lands from all commercial use, timber cutting, and grazing:

*Forests, they argued, absorbed rainfall, retarded stream runoff, and increased the level of groundwater; forests retarded snow melting in the early months of the year, reduced spring floods, and saved water for summer use when supplies ran low; forests retarded soil erosion and silting in irrigation ditches and reservoirs (Hays, 1959).*

The first national forest reserves were authorized by the Creative Act of 1891 (Act of March 3, 1891, ch. 561, sec. 24, 26 Stat. 1095, 1103). This legislation was followed by the 1897 Organic Administration Act (Act of June 4, 1897, ch. 2, 30 Stat. 34, 35 [emphasis added]), which provided management authority and direction for the forest reserves. The Organic Act expressed congressional intent that forest reserves be managed for both timber production and watershed protection:

*No national forest shall be established, except to improve and protect the forest within the boundaries or for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States (16 U.S.C. sec. 475).*

According to those who have examined the legislative record, many congressmen believed that watershed protection was, in fact, the sole justification for the forest reserves (Wilkinson and Anderson, 1985; Satterlund, 1972).

For the first few decades of their existence, the national forests were left in relative peace, with early forest management plans regulating grazing and timber harvesting in order to protect recreational opportunities, watersheds, and wildlife (Arjo, 1990). The national home-building boom following World War II, however, brought pressures to cut more trees and provide more water for consumptive uses. The Forest Service's policy of restricting timber harvests to protect watersheds was supplemented by a new view that timber cutting in the upper watersheds would increase stream yields, thus providing more downstream runoff (Wilkinson and Anderson, 1985).

In an effort to codify the Forest Service's increasingly complex management regime, the Congress enacted the Multiple-Use, Sustained-Yield Act of 1960 (MUSYA) (16 U.S.C. secs. 528-531) which included watershed protection as one of the specified multiple uses (the others are outdoor recreation, range, timber, and fish and wildlife) for which the Forest Service was to manage its lands. This was followed by the National Forest Management Act of 1976 (NFMA) (16 U.S.C. secs. 1600-1614), which added new procedural requirements to the Forest Service's planning process and included several new statements regarding watershed protection.

First, NFMA repeated the congressional directive to manage for all renewable resources, including watersheds (16 U.S.C. sec. 1604(e)(1)). It directed that guidelines for the creation of forest plans insure consideration of such environmental concerns as the protection of watersheds (16 U.S.C. sec. 1604(g)(3)(A)). NFMA went on to prescribe more exact standards under which timber harvesting may occur on national forests, stating that Forest Service regulations must insure that no harvesting will take place in areas where irreversible watershed damage will occur, where restocking within 5 years is not assured, or where wetlands and water quality are not protected (16 U.S.C. secs. 1604(g)(3)(E)(I)-(iii)). Moreover, NFMA said that if clear-cutting is to be used to remove trees, the Forest Service must determine that it will be implemented in such a manner that other resources, including the watershed, are protected (16 U.S.C. sec 1604(g)(4)(F)(v)).

Forest Service regulations written to implement NFMA address watershed protection by: (1) requiring planners to identify and evaluate hazardous watershed conditions, such as unstable soils; (2) providing instructions to avoid or mitigate damage at specific sites; and (3) requiring planners to give special attention to approximately 100-foot-wide riparian zones along perennial streams, lakes, and other water bodies (Wilkinson and Anderson, 1985). Critics have charged that the 100-foot buffers are inadequate to protect watersheds because timber harvesting and other activities on nonriparian upper slopes can have serious impacts on water quality and fish habitat (Doppelt et al., 1993).

Multiple-Use, Sustained-Yield Act of 1960 and NFMA remain the principal legislative directives governing Forest Service activities. While it has been pointed out that "some of the NFMA's most prescriptive provisions concern water quality" (Wilkinson and Anderson, 1985), others have criticized its emphasis on procedural rather than substantive requirements (Arjo, 1990). By contrast,

the Congress has placed substantive restrictions on federal land management agencies through provisions in the Clean Water Act (33 U.S.C. secs. 1251-1376). Water quality standards (for point sources of pollution) and best management practices (to control nonpoint sources, such as many aspects of timber harvest) promulgated by states are binding on federal land agencies such as the Forest Service (*Northwest Indian Cemetery Protective Association v. Peterson*, 1985). In practice, few states have exercised this authority to regulate activities that threaten watershed health; instead, most have entered into agreements making federal land managers primarily responsible for nonpoint pollution control within the lands they administer (Wilkinson and Anderson, 1985).

### ***Bureau of Land Management***

The Bureau of Land Management (BLM) has a much shorter history of managing its lands for watershed protection than does the Forest Service. BLM lands tend to be located at lower elevations and in more arid regions than national forest or national park lands and thus produce a smaller proportion of surface water runoff. It has been estimated that BLM lands produce only about 3 percent of the water yield from public lands (Doppelt et al., 1993).

The first statement of legislative intent for the stewardship of public domain lands came in the Taylor Grazing Act of 1934, which addressed watershed concerns by stating that one of its primary purposes was to "prevent soil deterioration" (Act of June 28, 1934, P.L. No. 482, ch. 865, 48 Stat. 1269). The Taylor Grazing Act was a response to decades of unregulated grazing of domestic livestock on lands that were essentially a public commons (Braun, 1986). Its provisions proved inadequate, however, to prevent continued deterioration of public rangelands, particularly the most ecologically

fragile riparian areas. A 1975 BLM report on range conditions indicated that 83 percent of the range was in fair or worse condition (Braun, 1986).

The Congress explicitly directed federal land agencies to manage for watershed protection in 1964 (Classification and Multiple Use Act) and then included resources dependent on watershed protection as part of BLM's multiple use mandate in the Federal Land Policy and Management Act of 1976.<sup>4</sup> The Federal Land Policy and Management Act amended the Taylor Grazing Act in a number of ways, primarily aimed at providing more opportunities for public participation in grazing management and requiring land managers to manage for a broader array of public resource values. Most relevant for watershed protection, the Congress directed the BLM to designate and protect "areas of critical environmental concern," defined as including "areas within public lands. . . where special management attention is required to protect and prevent irreparable damage to important. . . fish and wildlife resources or other natural systems or processes" (43 U.S.C. sec. 1712(c)(3)).

Two years after enacting the Federal Land Policy and Management Act of 1976, the Congress passed the Public Rangelands Improvement Act of 1978 (Act of Oct. 25, 1978, P.L. No. 95-514, 92 Stat. 1803), which recognized serious deterioration of public rangelands due to a variety of watershed problems: soil loss, desertification, increased siltation and salinity, reduction of water quantity and quality, loss of fish and wildlife habitat, increased surface runoff and flood danger, and the

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<sup>4</sup> Public Law 94-579, 90 Stat. 2743. The Act defines multiple use as including but not limited to: "recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historical values" (43 U.S.C. sec. 1702(c)). It defines "principal" uses of BLM lands as: "domestic livestock grazing, fish and wildlife development and utilization, mineral exploration and production, rights-of-way, outdoor recreation and timber production" (43 U.S.C. sec. 1702(1)).

potential for undesirable long-term local regional and climatic and economic changes (43 U.S.C. sec. 1901(a)(1)).

The Congress directed BLM to take rehabilitative measures to "restore a viable ecological system that benefits both range users and the wildlife habitat" (43 U.S.C. sec. 1901(a)(3)).

BLM's planning regulations seek to implement these legislative mandates. They state that watershed management

*... involves the protection, regulated use, and development of any public lands in a manner to control runoff; to minimize soil erosion, siltation and other destructive consequences of uncontrolled water flows; and to maintain and improve storage, yield, quality and quantity of surface and subsurface waters* (43 C.F.R. sec. 1725.3-3(h)).

The agency is paying increased attention to the protection of riparian areas, wetlands, and stream ecosystems in its broader policy statements (Doppelt et al., 1993).

While the two key statutes guiding BLM activities provide authority for the agency to take steps such as excluding livestock from sensitive riparian areas, they do not require the agency to do so (Braun, 1986). Like the Forest Service, BLM is also bound by the requirements of the Clean Water Act, which provides more specific standards for water quality protection.

### ***National Park Service***

The NPS operates under the preservation mandate of the National Park System Act of 1916, which requires NPS to manage designated parks, monuments, and reservations "to conserve the scenery and natural and historic objects and the

wildlife and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for future generations" (16 U.S.C. sec. 1). Specific park units are managed according to the purposes and objectives for which they were designated in their enabling legislation and under the broader provisions of the National Parks and Recreation Act of 1978 (16 U.S.C. secs. 1a-7(b)).

NPS management policies related to watershed protection include provisions for the protection of water quality and quantity, flood plains and wetlands, and federal reserved water rights (Doppelt et al., 1993). The agency, however, has very limited abilities to deal with impacts arising outside of park boundaries, which constitute a growing source of pressure on park resources. Such external activities often pose the greatest threats to watershed resources.

The NPS' Rivers, Trails, and Conservation Assistance Program helps citizens conserve rivers, establish trails, and provide outdoor recreational opportunities. The NPS, in partnership with citizens and state and local governments, is involved in the early phases of projects in setting up goals, resolving difficult issues, and reaching consensus about the future use and protection of important land and water resources, generally on nonfederal lands. The NPS is less often involved once a project reaches the implementation stage. Assistance is provided in developing greenways and trails, protecting river access and views, converting abandoned railbeds into trails, conserving open space, redeveloping and restoring mistreated resources, establishing nonprofit organizations, and enacting new ordinances. In 1996, the Rivers, Trails, and Conservation Assistance Program worked on more than 200 projects in 49 states.

## ***A Brief History of Federal Water Resources Commissions***

Federal water policy commissions have played a large role in defining federal water policy. This is the fourth major comprehensive federal water policy commission created in this century, in addition to other commissions that have included water policy within their charter or that have dealt with a single aspect of water management. The commissions have reflected the dominant thinking of their time and have both ushered in new eras and pointed to the transition from one era to another. The commissions' conclusions also have reflected the persistence of some basic ideas of water management that have remained relatively constant—ideas rejected at one time reappear later in the same or new form. The work of these past commissions provides a context for this Commission, which, while it builds on the work of previous commissions, reflects the values of a new generation of westerners.

Albert Gallatin's 1808 report calling for a nationwide network of canals, navigation improvements, and roads is considered to be the first major regional water resources report, but modern water resource commission reports generally date from President Theodore Roosevelt's appointment of the Inland Waterways Commission a century later. This commission was appointed after the federal government had committed itself to the reclamation of the arid West and at the height of the progressive conservation era, which stressed that resources should not be left unused—"wasted"—but should be put to the full range of their maximum possible human uses.

The Inland Waterways Commission was composed of high government officials with a knowledge of land and water, including Senator Newlands of Nevada, the primary force behind the Reclamation Act of 1902. The Commission reflected President Roosevelt's enthusiastic support for the widely

shared idea that river basins should be developed for multiple purposes—primarily carryover storage for summer irrigation, hydroelectric power generation, and flood control—and that the federal government should take the lead in river basin development. Commercial navigation was still the dominant water use, and coastal and inland cities were pushing large-scale interregional navigation improvement projects. The Bureau of Reclamation was starting to construct reservoirs to support its projects, while the Geological Survey was promoting the idea that water was a single resource with multiple uses.

The Inland Waterways Commission proposed that a single new federal agency be created to recommend multiple-purpose river basin plans to the Congress. The idea, however, was ahead of its time. Opposition from the Corps defeated Senator Newlands' bill to implement the Commission's report, and the Corps has been able to resist every effort since that time to merge it into the Department of the Interior or a new Department of Natural Resources. The Inland Waterways Commission's legacy nonetheless was substantial, and its recommendations still influence federal water policy debates. As a leading historian of natural resources policy observed: "The Roosevelt administration for the first time worked out the general principles and the specific elements of the multiple-purpose approach to river development which the New Deal put into practice over two decades later" (Hays, 1959). The report also laid the foundation for the long—but ultimately fruitless—effort to coordinate water resources development through a single federal agency.

The next effort, the Hoover Commission, was constituted after World War II and reflected the continued enthusiasm for federal water resources development as well as strategic general concern that there was a danger of resource scarcity unless resources were conserved and efficiently managed. The Hoover Commission also reflected a growing skepticism about the efficiency of federal water

projects. It was authorized a year after the First Hoover Commission report, which reiterated the Inland Waterways Commission's call for a single federal agency. The Hoover Commission, chaired by former President Herbert Hoover, recommended that the Corps, Reclamation, and the Bonneville and Southwestern Power Administrations be combined into the Water Development and Use Service within the Department of the Interior. It also revived the Inland Waterways Commission's call for a presidential "Board of Impartial Analysis for Engineering and Architectural Projects" composed of independent expert engineers.

The Hoover Commission carried forward the idea that the drainage basin was the best organizing unit for multiple-purpose water development and management. Coordination would be achieved by an interagency commission chaired by an independent presidential appointee. The assumption was that the Tennessee Valley Authority model would be carried to other basins starting with the Missouri basin. To support this idea, the Hoover Commission prepared an extensive analysis of federal and state water law and legislation to support the proposition that there was ample federal authority to support coordinated federal water resources development (President's Water Resources Policy Commission, 1950).

Two years after the Hoover Commission's report, the Eisenhower administration came into office, and that administration made two contributions to water resources development which triggered the next two national commissions. President Eisenhower appointed a cabinet committee which sought to reconcile the existing division of water responsibility with fiscal responsibility. The Advisory Committee on Water Resources reiterated the lack of federal agency coordination, generally endorsed the river basin idea, and called once again for an independent Coordinator of Water Resources who would report directly to the President. However, the report shifted coordination responsibility to the

Congress. The call for greater fiscal responsibility was politically premature, especially when it was implemented by President Eisenhower's "no new starts" policy in the 1958 budget.

Congressional reaction was swift. In 1959, the Congress created the Senate Select Committee on Water Resources. The Committee was composed almost entirely of western senators and supported by a distinguished professional staff. After one round of public hearings, the staff and consultants prepared a report that was submitted to the Congress in 1961. The Committee's report ushered in the last great era of water resources construction and recognized that new uses such as pollution abatement were important. It also acknowledged the close relationship between water and land development.

From 1907 through the 1960, the commission reports and other white papers were premised on the assumption that further western settlement had to be induced through water resources development. This was particularly true in the 1940s, when reclamation projects were viewed as an important component of the reabsorption of veterans into the economy. Development continued through the 1950s, despite mounting criticism of the efficiency and effectiveness of federal water investments. Gilbert White's classic 1968 National Academy of Sciences study, *Water and Choice in the Colorado River Basin*, was one of the first major studies to question the case for water resources development to promote regional growth and equity. The 1973 National Water Commission report made a comprehensive survey of the relationship between water development and regional growth and population distribution. Its conclusion was that "in the future, increased emphasis must be placed on the management of *existing* water developments as a means of improving regional growth potential rather than relying as heavily as in the past on new projects" (National Water Commission, 1973).

## **The National Water Commission: Still a Benchmark**

The National Water Commission grew out of the politics of Colorado River development in the 1960s. The Congress was considering legislation to authorize the long promised and planned Central Arizona Project and to finance it with revenues from two new dams at either end of the Grand Canyon. Southwestern water users also wanted the Congress to study the possibility of importing water from the Columbia to the Colorado River basin. The final 1968 legislation authorizing the Central Arizona Project created a National Water Commission to make a comprehensive assessment of the nation's water resources and their management.

The National Water Commission's report is a good baseline for this report because it partially reflected the transition from the Reclamation Era to the post-Reclamation era. While most of its recommendations remain as relevant today as they were in 1973, some specific problems did not emerge as the 1973 Commission had predicted. The Commission could not foresee the relatively rapid current collapse of the political consensus for continued water development and the redirection of federal fiscal policy from domestic spending to budget reduction. *Water Policies for the Future* assumed that federal water resources project development would continue at a slower rate than post-World War II activity but that it would continue to be the primary federal water resources function.

The 1973 Commission sought to impose a measure of fiscal responsibility on federal water spending and to assure that greater weight was given to alternative means of meeting demand and to environmental quality. Thus, the final report devoted a great deal of attention to improving the process of project planning and selection rather than to project operation. Further, 4 years after the 1973 Commission's report, President James E. Carter created a furor in the West by his "hit list,"

which sought to eliminate a number of long proposed water resources projects. Four years later, much less political controversy occurred when President Ronald Reagan used increased cost sharing to implement another "no new starts" policy. Today, the congressional consensus to balance the federal budget and reduce the debt burden has lessened interest in federal funding of water projects as well as the intense rivalry between the Corps and Reclamation to build projects.

The 1973 Commission defined pollution primarily as a point source rather than a nonpoint source problem. They did not explore the relationship between water pollution and biodiversity, a term not yet coined. The basic thrust of the 1973 Commission's report was that the case for subsidized water development no longer existed. It called for an end to future subsidies for reclamation projects and navigation improvements, greater use of water transfers, and the more accurate pricing of both irrigation and municipal and industrial water. It criticized over-reliance on structural flood control measures.

It advocated the increased use of rigorous economic analysis in evaluating new projects such as inter-basin transfers and cast a cautious and cold eye on technological fixes such as desalinization, precipitation augmentation, and brushland management.

The 1973 Commission's chapter on the accommodation of environmental values supported the use of the new NEPA as the focus of environmental review and recommended that the Congress reserve for itself the final balance. It assumed that the agencies or the Congress would be the ultimate decision-makers; thus, it failed to anticipate much of the current diffusion of power among other levels of government, user groups, nongovernmental organizations, and other stakeholders. Because the 1973 Commission assumed that the federal government would be the primary water developer and



regulator, it logically focused much of its attention on the improvement of decisionmaking at the federal level.

The 1973 Commission's pivotal chapter on making better use of existing supplies defined the post-reclamation era, and the list of suggested reforms remains the reform agenda today. The National Water Commission endorsed:

- Improved groundwater management
- The need to move toward marginal cost pricing of water to fairly and accurately reflect the opportunity cost of the specific use
- The reduction of transaction costs and legal barriers to the transfer of water to new uses
- The passage of laws that allow instream flow rights to be acquired and the liberalization of standards of navigability to allow greater stream access
- The increased efficiency of water use both on the farm and in urban areas through new technology and demand management
- The reuse of municipal and industrial wastewater

*Water Policies for the Future* contained a penetrating critique of water resources decisionmaking, and this Commission has studied the lessons of the 1973 Commission in order to implement and improve on them. In other areas, the National Water Commission called for greater integration of land use and water planning on the erroneous assumption that the Congress would pass a national land use planning act which would include federal grants for improved state and local planning. It called for the integration of water quality and quantity planning which still occurs today only on an ad hoc basis. It

also called for the protection and quantification of tribal reserved water rights and gave a qualified endorsement to increased public participation. Considerable attention was given to the budget process, and the 1973 Commission endorsed regional breakdowns of major portions of the budget (National Water Commission, 1973). It also addressed the longstanding problem of competition and duplication among agency functions and called for a centralized data collection agency. The National Water Commission stopped short of calling for a Department of Natural Resources because it forecast Reclamation's long-term role as resource manager rather than project construction agency and saw a similar, but more radically diminished, role for the Corps.

The National Water Commission carefully studied existing river basin management. The river basin planning commissions authorized by Title II of the Water Resources Planning Act of 1965 were still functioning, but the 1973 Commission noted their lack of construction and management authority (that ultimately contributed to their demise). It endorsed the interstate compact as the preferred allocation method, but it concluded that more innovative governance mechanisms were needed, and endorsed the creation of a new type of federally chartered river basin corporation that would have planning, construction, and regulatory functions.

### **Themes Common to Previous Water Commission Findings**

Several ideas have remained relatively constant in these commissions' studies. The first is the assertion of a strong federal interest in water development and management to promote the more efficient uses of water, to overcome sectionalism, and to provide equity among states. The control of western water resources has always been decentralized; users developed a variety of customary and experimental allocation regimes before the courts developed the

ground rules for entitlements and states tried to do so through administrative regimes. The federal government asserted its constitutional powers to regulate water after the principle of state control was firmly established. Multiple-purpose water resources development has been an engineering vision designed to benefit specific regions as well as to achieve the efficient use of public funds and the available water budget.

The second recurring idea is the endorsement of the river basin as the right management unit. This idea can be traced to the scientific surveys of the West starting with the Lewis and Clark expedition. John Wesley Powell's famous *Report on the Lands of the Arid Region of the United States* and his subsequent writings proposed to settle the West with private, community-based irrigation districts, based on the Hispanic pueblo communities and the Mormon settlement towns, whose boundaries corresponded to river basins rather than the rectangular public lands survey.

The third great constant is the need for the federal government to get its house in order. The separate development of federal programs to deal with the first-generation multiple uses—irrigation, flood control, and hydroelectric power generation—has frustrated coordinated and efficient water resources development. Federal water policy remains an unrationalized accretion of the interests of many constituencies. The overlay of the second generation of multiple uses—water pollution prevention and biodiversity maintenance—has only complicated matters. New federal agencies, with no direct responsibility for water development and management, have been given strong environmental protection mandates by the Congress. These mandates are not well integrated with previous agency missions and authorities.